

# NRCS Investments in the Western Lake Erie Basin



With technical experts throughout the Western Lake Erie Basin—Ohio, Indiana, and Michigan—USDA's Natural Resources Conservation Service (NRCS) offers science-based solutions to farmers who are working to reduce the runoff of nutrients and sediment and help improve water quality downstream. From planting cover crops and filter strips to installing water control structures, the basin's farmers are voluntarily doing their part. Conservation investments improve water quality while strengthening farming operations, boosting air and soil quality, and enhancing wildlife habitat.

Between 2009 and 2014, NRCS has made significant investments in the Western Lake Erie Basin, helping producers put conservation on the ground with approximately \$57 million through programs like the Environmental Quality Incentives Program (EQIP), the Wildlife Habitat Incentive Program (WHIP), and Conservation Stewardship Program (CSP). These practices, implemented through more than 2,000 conservation contracts that cover more than 435,000 acres, help improve water quality as well as increase efficiencies and lower inputs for farming operations. On average, farmers match NRCS funding with contributions of half the cost of implementing practices. The benefits of conservation efforts often last long after the work is completed.

NRCS conservation practices work. NRCS' Conservation Effects Assessment Program estimates show that between 2009 and 2014, the new practices farmers installed with NRCS assistance have reduced annual nutrient and sediment losses by approximately 7 million pounds of nitrogen, 1.2 million pounds of phosphorous, and 488,000 tons of sediment.

Agriculture is a significant land use in the 7 million-acre basin that includes Ohio, Indiana, and Michigan. Voluntary conservation efforts are especially important in the Great Lakes, which collectively hold 21 percent of the world's fresh water. Lake Erie provides drinking water for 11 million people. Lake Erie is also the foundation of an \$11.5 billion tourism industry in Ohio.

## Current Efforts to Address Water Quality

Heavy rainfall in summer 2015 greatly impacted Lake Erie, causing nutrients, sediment, and pollutants to flow into waterways from a number of sources. Farms contribute to the problem when excess phosphorus flows off farms into waterways. High levels of nutrients and warmer temperatures fuel the growth of algae, and some of these algae create harmful toxins.

NRCS works one-on-one with farmers to put conservation systems to work on their land, controlling water on and off fields, building soil health, and managing riparian areas on the farm. Conservation efforts like these are especially important in addressing agricultural sources in lakes that suffer from too many nutrients and associated harmful algal blooms. Large algal blooms are implicated in health risks such as the Toledo, Ohio, water crisis in 2014, spurred by toxins from algae.

So far in Fiscal Year 2015, NRCS has devoted approximately \$7.6 million in financial assistance for producers in the Western Lake Erie Basin across a range of conservation practices like cover crops, nutrient management, drainage water management and blind inlets.

Conservation practices like these build soil health as well as manage water on farm field.

NRCS committed an additional \$5 million this year, enabling NRCS to continue its one-on-one work with farmers in the tri-state area. The funding will enable NRCS to work with both farmers who have not yet used conservation practices as well as those who use them and want to take their efforts to the next level.

Coordinated and targeted efforts like the Great Lakes Restoration Initiative (GLRI) and National Water Quality Initiative (NWQI) accelerate funding in priority watersheds, including those that flow into the Western Lake Erie Basin. Plus, the agency partners with other organizations to leverage resources and maximize outcomes through the Regional Conservation Partnership Program (RCPP) and Conservation Innovation Grants (CIG). These partnerships also cultivate innovation, evidenced in cutting-edge practices now used by NRCS, including amending soil with gypsum and monitoring water quality.

## Conservation at Work in the Basin

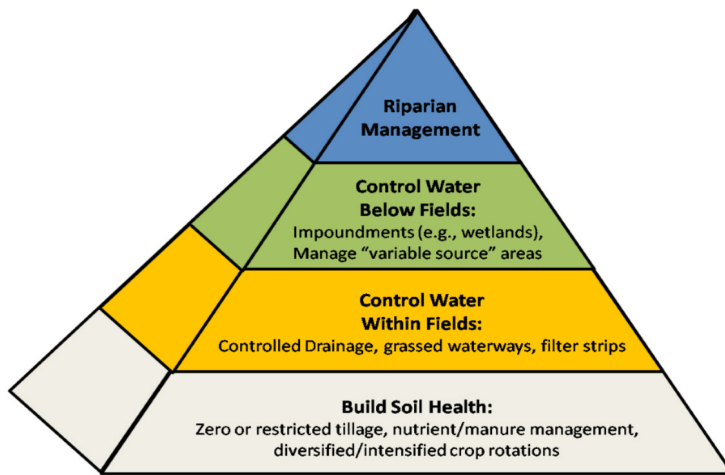


Photo credit: Agricultural Research Service

NRCS provides technical and financial assistance to farmers through a variety of Farm Bill programs, such as the Environmental Quality Incentives Program (EQIP), enabling them to put conservation systems to work on their land. These conservation systems employ a variety of practices that help improve water quality through avoiding nutrient losses, controlling nutrients in farm fields, and capturing of nutrients and sediment before they leave a farm. Farmers can do this through building soil health, controlling water on and off fields and protecting riparian zones.

### Building Soil Health

Imagine a pyramid with soil health practices at its base. When soil is managed properly, it's less likely to erode, keeping it and the nutrients it often brings with it out of waterways. NRCS works with farmers to establish practices that keep the soil covered, like planting cover crops, and limit disturbances to the soil, like using no-till or strip-till.

These practices net big benefits – both for natural resources and the environment. They not only prevent

soil erosion, but produce bigger yields and build resilience to drought and other climatic extremes.

NRCS used cover crops as an emergency response to the water crisis in Toledo, Ohio, in 2014. Through a special effort, NRCS helped farmers plant cover crops on more than 56,000 acres. The goal of this \$3.2 million investment was to cover vulnerable soil with plants like cereal rye and ryegrass between the fall harvest and spring. These cover crops absorb nutrients, store them, and recycle them for the next year's cash crops. Even with short deadlines to participate, farmers showed great interest, requesting more funds than were available (\$5 million to plant cover crops on 86,000 acres).

### Controlling Water

Next, in the pyramid of practices, NRCS works with farmers to manage water on the farm. Water is an integral part of farming, and NRCS helps producers implement practices that help them manage water while preventing erosion and removing nutrients and sediment along the way.

Conservation practices to manage water come in all shapes and sizes.

Some require a good bit of engineering, like managing the timing of water flowing from tile drains and constructed wetlands, while others are as simple as a grassed waterway. Some are implemented in fields, and others outside of them. But they share one commonality – they keep nutrients from leaving the farm.

### Protecting Riparian Zones

Finally, at the top of the pyramid, NRCS helps farmers manage the water leaving their farm. Conservation practices like filter strips and buffers protect the waterways that border and bisect farms. Ditches, creeks and rivers all send their waters downstream, and in this case, to Lake Erie.

Filter strips, buffers and other similar practices are used along waterways, where they use plants to slow and filter water. NRCS recommends the use of native grasses, better suited for an area's climate and more resilient to drought and climatic extremes. Filter strips and buffers often double as a filter for nutrients and vibrant habitat for wildlife. In the Western Lake Erie Basin, they provide habitat for ground-nesting birds and other wildlife.

## Targeted Conservation Efforts

Landscape-level conservation efforts enable NRCS to target key areas of need based on the latest science-based research available. The idea is that when a significant number of farmers take action in one area, it makes a big difference. NRCS uses GLRI and NWQI to deliver conservation in priority watersheds. Through monitoring and modeling efforts, NRCS is able to quantify the benefits of conservation practices, providing valuable data for improving conservation efforts.

### Great Lakes Restoration Initiative

GLRI is a collaborative effort with 11



Federal agencies, including NRCS, to direct funding to watersheds most in need. GLRI is part of a larger national strategy to improve water quality in the lakes. As part of an interagency funding agreement led by the U.S. Environmental Protection Agency, GLRI encompasses a broad partnership of Federal, State, local, and non-governmental organizations taking action in the basin.

NRCS focuses its work on private lands in priority watersheds. These phosphorus priority watersheds are part of river systems, such as the Maumee and St. Marys, which flow into the lake.

This year, NRCS invested \$1.5 million to put conservation systems on more than 20,000 acres. Of that funding, NRCS invested \$1 million in Ohio in response to the 2014 algal bloom, which helped farmers place conservation practices on more than 4,600 acres.

Additionally, NRCS is in the process of finalizing an agreement with the Ohio Farm Bureau Federation, establishing demonstration farms in the basin. Funded through GLRI, these farms will be open for tours that will show farmers a number of different conservation practices at work.

**National Water Quality Initiative**  
NWQI is a priority watershed-based initiative that concentrates conservation efforts in watersheds, selected with input from State water quality agencies, for critical concerns for water quality. In 2015, NRCS made \$25 million available to farmers in more than 170 watersheds across the country, including watersheds in Ohio, Indiana, and Michigan that flow into Lake Erie. This is the fourth year of the initiative, building on a more than \$85 million investment since 2012.

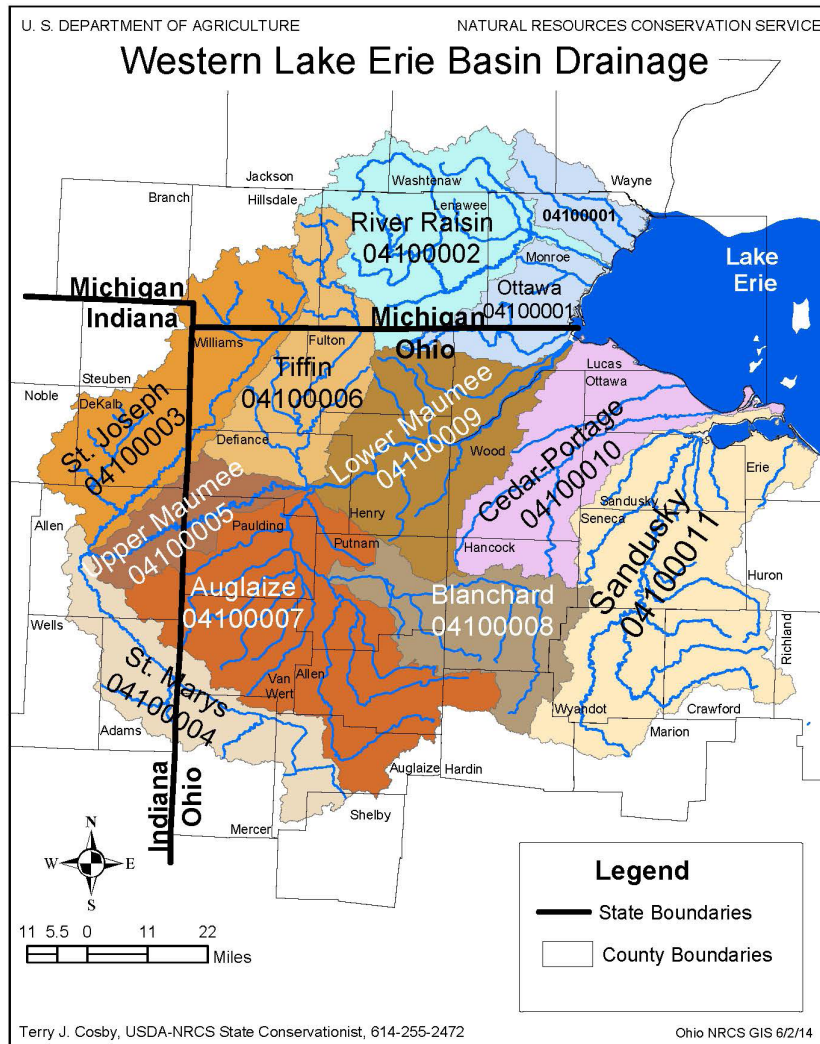
For example, in Ohio, NRCS worked with 75 percent of farmers in the East Branch South Fork Sugar Creek watershed, implementing practices that reduce runoff of phosphorus and sediment, preventing them from eventually flowing to Lake Erie. The goal for this watershed is to reduce the amount of nutrients and sediment by 30 percent, helping make the waterway suitable for aquatic life.

NWQI is leading to positive results across the country, including the removal of streams from EPA's impaired streams list.

### Water Quality Monitoring

Water quality monitoring helps NRCS evaluate the benefits of conservation at the field level. Through monitoring, NRCS works with farmers and conservation partners, such as universities and non-governmental organizations, to monitor the amount of nutrients and sediment in water runoff from a field and compares the improvements under different conservation systems.

Edge-of-field monitoring stations enable NRCS to measure water quality benefits at the edge of farm fields rather than try to estimate conservation effects from in-stream measurements that are subject to influences outside of the farmer's control. Conservation practices typically evaluated include planting



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cover crops and using no till, nutrient management, and practices to reduce and trap nutrients and sediment. By combining edge-of-field monitoring with stream monitoring, a more thorough picture of the impact of improvements within a watershed can be observed.

This year, NRCS made available \$2 million through EQIP to interested farmers wanting to install stations on their land. Funding was available to farmers in eight states, including Ohio. The application period closed July 2015, with 10 of the 12 applications coming from farmers in Ohio, showing a heavy interest in this practice in the Lake Erie region. More information on this effort will be available later this year.

Also, through GLRI, NRCS is working with the U.S. Geological Survey to install two monitoring stations in the Upper Maumee River and St. Marys River watersheds in Indiana in August 2015. The monitoring equipment will gather data on rainfall, runoff volumes, sediment, phosphorus, and nitrate in both runoff and the water.

## Leveraging Resources and Cultivating Innovation

NRCS partners with other organizations to leverage resources and maximize outcomes. RCPP and CIG enable NRCS to benefit from the expertise of other organizations while cultivating grassroots partnerships.

### Regional Conservation Partnership Program

Through RCPP, authorized in the 2014 Farm Bill, NRCS is investing in a project that rallies together more than 40 partners to spur voluntary conservation practices that will reduce phosphorus runoff into the basin. The Tri-State Western Lake Erie Basin Phosphorus Reduction Initiative has been so popular that the \$17.5 million invested by NRCS and millions of dollars matched by partners may be exhausted in the first or second year.

This new investment builds on 10 years of work done by the Western Lake Erie Basin Partnership, a coalition of local, State, and Federal agencies and groups. This project was in the first wave of projects funded through RCPP.

Of the more than 100 projects funded, about 70 percent of them focused on water quality.

With the Great Lakes Region selected as one of the nation's eight critical conservation areas, which receive 35 percent of RCPP's funding, more projects like these are anticipated in the future.

### Conservation Innovation Grants

Through CIG, NRCS helps stimulate the development and adoption of innovative conservation approaches and technologies. These grants enable NRCS to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns, including water quality issues.

Currently, NRCS is investing \$1.7 million in two grants. These funds are enabling The Ohio State University and Heidelberg University in partnership with USDA's Agriculture Research Service to improve water quality monitoring efforts, given the unique soil and climate conditions in the region.

This grant program has also helped NRCS improve and grow its offering of conservation practices, including the adoption of water quality monitoring as a practice in 2013 and gypsum as a soil amendment in 2015.



Michigan Farmer Jerry Heck, whose farm is not far from Lake Erie in Monroe County, shows a water control structure installed on a field tile outlet. The device lets Heck manage how much water is drained from his fields and reduces nutrient loading to surface water.





This outlet, which is part of a subsurface drainage system that drains excess water from wet soils, has a water sampling intake mounted inside to monitor phosphorus levels in the drainage water.



Edge-of-field monitoring helps quantify the effects of conservation practices.

### **New Conservation Practices Help Farmer Prevent Phosphorus Runoff**

Gypsum, also known as calcium sulfate, is the main ingredient in drywall and the chalk used to write on classroom blackboards. More importantly for farmers, a body of research is emerging that gypsum provides farmers with a tool to reduce phosphorous runoff from their fields, potentially serving as part of the solution to harmful algae blooms plaguing water bodies like Lake Erie.

Beginning in October 2015, NRCS will provide financial assistance to farmers who apply gypsum as a soil amendment. A few States, including Ohio and Indiana, are piloting its use, and NRCS recently published an interim practice standard, making the gypsum soil amendment practice available nationwide.

Farmers can apply gypsum for a number of reasons. Gypsum applications can improve soil health through increases in sulfur and calcium, both essential crop nutrients. The additional calcium can also improve soil structure, increasing water infiltration. Perhaps most intriguingly, researchers have shown that gypsum binds soluble phosphorous, keeping it in the soil and increasing phosphorous availability to crops instead of it running off into local streams.

Professor Warren Dick of The Ohio State University has been researching the water quality benefits of gypsum applications. His research was partially funded through CIG in 2012. He found that over three years, a single gypsum application led to an average 39 percent reduction in soluble phosphorous.

With his research now in its third year, Dick notes that while the soil health benefits of gypsum applications remain consistent, the reduced phosphorous loading benefits seem to decline over time. "For water quality purposes, it may be better to apply gypsum in smaller amounts annually to maintain maximum phosphorous reduction benefits," he said.

His research is conducted on farms in the Maumee River watershed, the largest tributary to Lake Erie and a key source of the excess phosphorous loadings in the lake.

**Feature Story****Conservation-minded Farm Family Works with NRCS to Help Clean Lake Erie**

The residents of Putnam County, Ohio, understand the dynamics of water. The county lies in the western reaches of the Maumee River watershed, a 4.5 million acre area that drains into Lake Erie. In August 2007, more than a foot of rain fell in less than a week. Putnam County was hit the hardest, recording 8 inches of rain in 48 hours. It was the worst flood experienced by residents in nearly 100 years.

Gerald and Cheryl Whipple grow row crops and wheat on their 338-acre farm in Putnam County, as did Gerald's father and grandfather. Gerald attributes his conservation ethic to these men; men who put in filter strips along the creek over 50 years ago, where they remain to this day.

The Whipples plan for conservation just as they plan for their crops, as

an integral part of the whole farm plan. In this part of Ohio, managing the land for drainage can make the difference between success and failure in any given year. The rich, fertile topsoil built up over centuries can wash away in hours in years like 2007. Fertilizer, like phosphorous, often washes with soil.

This phosphorus fuels algal growth, a critical problem plaguing Lake Erie. Gerald Whipple understands that conservation-minded farming benefits his bottom line, as well as the health of the people reliant on drinking water pumped from Lake Erie.

Whipple's conservation system protects and improves his soil, minimizes the use of costly fertilizers and pesticides, and provides his crops resiliency to extreme weather, like floods and droughts. It includes no-till, soil testing, fertility mapping and yield monitoring, and variable rate fertilizer application technology. To reduce erosion and sedimentation,

they installed grass waterways and grade stabilization structures.

Through GLRI, they planted over 170 acres of cover crops, using seed he had grown on the farm. Whipple attributes increased soil organic matter and decreased use of herbicides to cover crops, explaining the cover crops minimize weed growth.

Their land stewardship ethic extends beyond their farm operation; the Whipples share their experiences with others in the community through service on the Putnam County Soil and Water Conservation District, which Gerald currently chairs. They also host field days and events and speak to groups about conservation on their farm. For all of these reasons and more, the Ohio Farmer selected the Whipples as one of five families for their 2014 Conservation Farm Family Award.



An NRCS employee takes a soil sample on a farm that has incorporated many conservation practices to protect and enhance natural resources (like soil).

